AUDECIBEL

FALL 1953
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This issue contains scientific papers by:

- Barry J. Anson, Ph.D. (Med.Sc.)
- Heinrich G. Kobrak, M. D.
- Alfred Lewy, M.D.
- Emanuel M. Skolnik, M.D.

JOURNAL OF THE SOCIETY OF HEARING AID AUDIOLOGISTS

SOCIETY OF HEARING AID AUDIOLOGISTS
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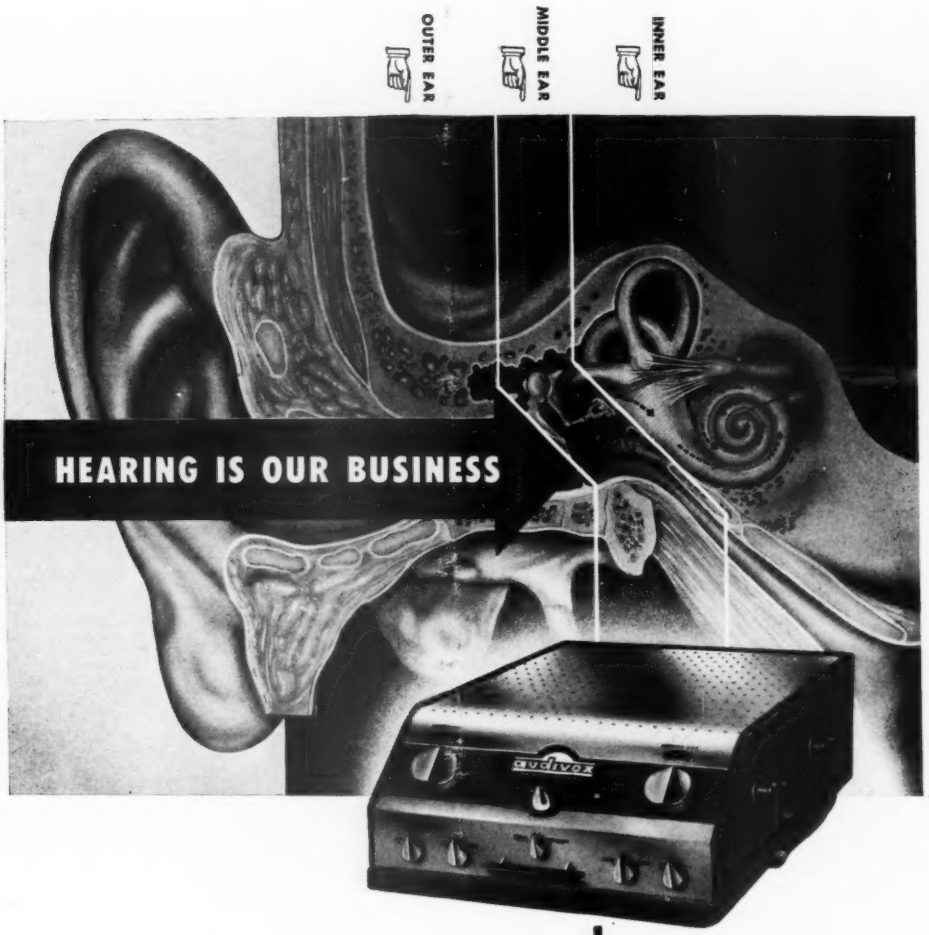

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The Purpose. ***Audecibel*** is strictly an educational and professional journal, the purpose of which is to bring to the otologist, the hearing aid audiologist and others interested in the field of hearing and audiology, authoritative articles, papers and data concerned with research, techniques, education and new developments in the field of treating and assisting the hard of hearing.

The Goal. The ***Society of Hearing Aid Audiologists*** is dedicated to the goal of reaching and maintaining the highest possible ethical standards in the field of hearing aid audiology. • ***Audecibel*** is dedicated to the goal of rapport among all those concerned with the hard of hearing so that mutual and overlapping problems may be recognized, and outstanding ideas, skills and experiences be shared for the greater benefit of all. You are urged to write in for details of how YOU may participate in and benefit by this worthwhile endeavor.

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Official Publication of the

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Thornton Zanolli, ***Editor*** — **Edgar Miller,** ***Art Editor***

Grover C. Coil, ***Managing Editor***

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Best Greetings of the Season

. . . to our 552 Certified Members of the Society of Hearing Aid Audiologists . . . to 7,000 registered (AMA) Eye, Ear, Nose and Throat Physicians . . . to the Staffs of 463 Hearing Clinics, Veterans Bureaus, Schools, Colleges, Technical Libraries and similar services among our readership . . . to the more than 4,000 Hearing Aid Retailers throughout the world who receive AUDECIBEL . . . to our Advertisers and all Industry Members . . . and to everyone concerned with improving the welfare of the more than 15,000,000 hard of hearing persons in the United States. Success to you and God grant you and yours a happy, healthy and rewarding Holiday Season.

Grover C. Coil

RESEARCH—Good and Bad

...a Message from *Grover C. Coil*

Research carried on within an industry can, as we all know, have far-reaching effects and ultimate benefits for all branches of the industry. Research done outside of an industry by others may sometimes produce effects that are not beneficial but definitely detrimental to an industry in whole or in part.

This kind of research and its effects upon an industry is illustrated by the fact that only a few years ago there was a shortage of animal fats—lard and butter. No one in those industries had any idea that they would ever be faced with a troublesome surplus in those two commodities. However, due to research and propaganda by the vegetable-oil industries, we now have an enormous surplus of lard and butter. In fact, there is so much of these products in storage that nobody knows what to do with them. Fortunately, for the producers although not for the taxpayers, the national government has provided a subsidy for these two commodities.

Another excellent example is the situation in regard to cotton and wool which are being supplemented and in some cases supplanted by chemical fibers. Officials of the Du Pont Company are credited with the statement that by the year 1970, which is 16 short years from now, it is anticipated that more than 60% of their facilities will be used in producing products which are not even known today, on some of which they are only now engaged in primary studies.

Sixteen years ago there were no audiology clinics. Ten years ago the general public had little or no knowledge of audiology clinics. Due to publicity and propaganda by government agencies, institutions and private enterprises, the buying public have been alerted and informed regarding clinics and clinical procedures.

Research concerning hearing aid design, evaluation and all of the problems pertaining to and associated with their use including the manner and point of purchase, conducted by others outside of your industry can be bad for you.

Every year more and more information of this nature is being provided for and given to the hard-of-hearing public and the public generally. What this research by others is doing to your branch of the hearing aid industry is comparable to what happened to the butter and lard industry. Unfortunately, however, there are no government subsidies for hearing aid retailers and distributors.

For the last decade most of the research done by hearing aid manufacturers has been in the field of product improvement. That great strides have been made and achievements accomplished is beyond dispute, but only by a process of education have the manufacturers become better informed so as to be able to meet the challenge created again by research by others in the electronics, supply and parts industry.

Thus, by education, the manufacturers were able to benefit from this research by others. To survive, manufacturers were compelled to acquire education in new fields and advance their skills in design and production. Just so surely as the product has changed and passed into a new era, the distribution of the product is rapidly passing into a new era. This transformation is being speeded up by research and propaganda of others.

Look about you! Where are the big-time, hot-shot operators of a few years ago? They and their era have passed.

Reports indicate that in less than ten years from now, more than 30% of the population will be 45 years of age or older. The age group of 60 and over is increasing rapidly and in this bracket about 25% could use hearing aids. At the other end of the age spectrum, more young children are being taught the use of hearing aids than ever before. Greater numbers of that large group of people with borderline hearing impairments are purchasing and using hearing aids because of the combination of improved hearing aid design and fitting techniques and public acceptance.

There will be more hearing aids manufactured and sold in 1954 and in the years to come than ever before, but, WHO in the future will sell them to this better educated and better informed public? Mostly they will be sold by better informed persons whose competence, reliability and responsibility have been proven and which are vouched for by competent authorities. Will your name be on this list?

There are good clinics. That is beyond any reasonable doubt. No thinking person would deny for one moment that the work carried on in audiology clinics at Johns Hopkins, Harvard, Central Institute, Northwestern University and other institutions of that caliber has not been in the public weal.

There are many other clinics whose contribution to the public well-being is questionable. As early as July, 1951, Mr. L. A. Watson pointed out that at that time there were more than 140 clinics. This number has probably more than doubled by this time.

Of these, Mr. Watson stated that 53% were making and selling earmolds in competition with dealers; that 50% of them had their doors open to the general public with or without medical referral of any kind; 85% were making charges for their services, ranging from $5.00 to $40.00

(Continued on Page 14)

In Memoriam

In the memory of **Alice Peterson** grateful acknowledgment is herewith made to Grace Peterson of Elmhurst, Illinois for her contribution to the Society of Hearing Aid Audiologists.

Voluntary contributions such as the above-noted are used to help the Society in its work of providing hearing aids for hard-of-hearing persons who might otherwise not be able to afford them.

George Davis, died in his sleep December 2nd, New York, N.Y., leaving a wife and son. He will be missed and long remembered by members of the W.E. dealer group.

Electro-Acoustic Design Considerations for *The Transistor Hearing Aid*

by Harry Shaper, President, Dyna-Labs

"Is the transistor here to stay?" Here is a man who says it undoubtedly is. In his opinion, the transistor amplifier will permit two directions of development to take place in the hearing aid field.

The obvious development is that units will become smaller, have unusual economy, and will be highly wearable from a cosmetic point of view. Complete units mounted on combs in women's hair, or on earrings, are now foreseeable.

The second direction, one in which the engineer would probably aim, will be toward units which are, perhaps, considerably larger than the above types but which would include steps forward in the directions of quality, frequency spectrum, and range of hearing. For example, it would be highly beneficial for those people not psychologically sensitive to their hearing loss, to use binaurel hearing devices; that is, to have two systems enclosed in one hearing aid which would allow for stereophonic sound pickup. Tone controls in very noisy locations are a real necessity for some people who need to work and live in noisy areas but yet may like to listen in quiet areas to high fidelity entertainment programs.

Two Basic Considerations

There are two basic considerations in developing electro-acoustic devices for hearing aids: delivery of sufficient power to the ear, and secondly, the intelligence transmitted which is represented by the frequency spectrum and linearity response in the unit.

A hearing aid is composed of three fundamental units, namely, a microphone, an amplifier, and a receiver. It is necessary to convert acoustic energies into electrical energies in order to amplify them since, at the present stage of the electronic development, we only know how to amplify electrical energies with reasonable efficiency. Therefore, the microphone is the first link in the amplification process since it converts the acoustic energy into electrical energy. The amplifier always has associated with it certain inherent noises due to the noise generated by the flow of electrons in the circuits, by microphonics, by clothing noise, etc. The receiver has the function of converting the amplified energy back into acoustic energy with high efficiency in order to permit the wearer to use batteries of tiny size and get a reasonable life.

The problem in designing a microphone for a transistor amplifier is that it must deliver sufficient power to the input of the transistor amplifier with a suitable frequency spectrum to transmit the actual intelligence in speech The normal human ear is an extraordinarily sensitive organ which is able to pick up sounds of extremely low power levels. For example, the power required to light a vest pocket penlight bulb is in the order of one watt. In other words, it takes that much continuous flow of energy to supply enough heat to raise the temperature of the filament of the bulb to incandescence and maintain it. Compared with this level of one watt, normal speech power levels as transmitted in air at approximately three feet from the speaker, run in the order of one hundredth of a millionth of a watt. It is necessary to design a microphone to convert acoustic energy at this level into electrical impulses at a sufficiently high efficiency to operate the transistor amplifier above its inherent noise level. As in all designs, it is necessary to achieve a compromise between size and efficiency and the quality of reproduction of sound.

Design Limitations

In general, a hearing aid, in order to be wearable, allows a space for the microphone which is wafer thin and on the order of 1″ in diameter. It is obvious that the larger the diameter of the diaphragm of the microphone, the better coupled to air the microphone becomes, and the larger the sector of sound which can be intercepted by the microphone. So it is seen that as the diaphragm diameter is increased, the sensitivity, all other things being equal, is increased, permitting higher efficiency in converting acoustical to electrical energy. The designer, however, must limit himself to practical dimensions. This means he must, if possible, make up for the diaphragm size limitations with highly efficient coils and magnets so that the motor element inside the microphone itself is an efficient device. Modern developments in magnets and iron, and very tight production control of air gaps—the space in which the diaphragm vibrates to change the magnetic field—insure efficient conversion.

It is possible to increase the sensitivity of the microphone by taking advantage of resonance phenomena. It is necessary to transmit certain frequencies that are usable to the hard of hearing person. This is the region of 300 to 4000 cycles per second. We can so resonate the diaphragms and the acoustic cavities that large amplitudes of vibrations are achieved with light forces. Similarly, for example, a very light blow struck against a door chime causes it to produce very large sound levels, whereas if the door chime system were not tuned, the sound levels would be correspondingly lower. However, in order to take advanatage of tuned circuits in hearing aids, it is necessary to space them suitably in the response curves so they do not produce undue distortions.

Best Frequency Range

We have a wealth of data available as to the actual frequencies in normal speech which transmit intelligibility. For example, recognition of vowels is mainly dependent on effective transmission in the low frequency ranges, the bass tones; whereas articulation — consonant intelligibility — is transmitted in the high frequency range. After considerable experimentation and data taking, it has been determined that for maximum balance between high articulation and recognizability of speakers' voices, and general overall satisfactory tone, it is necessary to have a microphone which tends to accentuate high frequencies or the high pitches in speech. This produces a crisp and highly interpretable intelligibility through normal room noises.

At present, it has been possible to design wafer thin magnetic microphones which effectively meet these requirements in a unit approximately 1″ in diameter with a major case thickness in the order of 1/8″ with some protuberances for magnets, terminals, etc. This microphone for normal speech delivers approximately one-thousandth of a millionth of a watt to the transistor amplifier. The transistor amplifier then has the job of increasing the power level of this electrical input signal up to a level in the order of two or three thousandths of a watt. It is, of course, possible to design amplifiers which will produce higher power levels, but once again these are limited by the batteries and additional stages of amplification required which will again increase the size of the unit above its salable commercial size. Therefore, it becomes necessary to design an electro-acoustic earphone or receiver of high sensitivity which will convert these electrical powers into acoustic powers once again.

Commercial Requirements

The insert earphone again is limited to commercial requirements, that is, it must be relatively inconspicuous and yet be an efficient operating unit and be able to transmit the essential frequency spectrum of sound to the ear. Well known to users of hearing aids is the fact that the insert receiver is able to take these two or three thousandths of a watt of electric speech power and convert it to high intensity acoustic power, since it is coupled to the eardrum in close proximity. For example, with some of the presently available high sensitivity electromagnetic receivers, it is possible to produce power levels close to the acoustic pressure of pain.

There is room for considerable improvement in dynamic limitation of the peak output powers available, especially for the nerve-deafened cases. The art of building hearing aids is, at this moment, on a new level and considerable progress should be made engineeringwise in the near future.

Important Note to* AUDECIBEL *Readers: We are making every effort to bring to you, in as complete form as possible, the outstanding papers as presented by speakers at the SHAA Meetings, both in Chicago and New York. However, much of this material was presented from notes, rather than a complete paper, and therefore must be abstracted from stenotyped notes made at the meeting. Also, speakers frequently work with slides and/or film, which it is difficult, if not impossible, to translate into written form. In some cases, as with Dr. Anson and Dr. Skolnik, whose papers appear in this issue, they kindly agreed to personally prepare manuscripts for AUDECIBEL, incorporating as completely as possible the material covered in their addresses. A new department, The Gist of Things (see page 16), will carry some of the important supplementary material brought out in discussions following the various addresses.

The Hearing Aid User is not dependent on you—you are dependent on him.

Anatomy of the Ear

by *Emanuel M. Skolnik, M.D.*
Assistant professor of Otolaryngology
University of Illinois

In addition to his professorship, Dr. Skolnik is a member of the attending staff, Research and Educational Hospital and Illinois Eye and Ear Infirmary, and also Otolaryngologist for Cleft Palate Program, Division of Services for Crippled Children, State of Illinois.

The Ear and its Divisions

The ear consists of three divisions: external, middle and the internal; the greater part of it is enclosed in the temporal bone. The ear is in close proximity to the brain, large blood vessels and nerves. Yet, paradoxically, for mechanical completeness, the middle ear is in direct communication with the nose and throat and, therefore, subject to a large variety of infections common to these upper respiratory passages.

The internal ear contains the sensory organs for the perception of sound (acoustic labyrinth) and the maintenance of body equilibrium (static and kinetic labyrinth). The former constitutes the cochlear portion, the latter is represented by the vestibular portion. Though the kinetic labyrinth has an important role in establishing the relationship of its organism to its environment in space (postural reflexes through proprioceptive stimuli), it is but one of three mechanisms subserving the same purpose, viz., (1.) the labyrinth of the internal ear, (2) the eye, and (3) the tendon, deep muscles and joint sensibility. The external and middle ear merely serve the purpose of collecting and conducting air-borne sound waves to the cochlea.

The External Ear

The external ear is that portion of the auditory apparatus located lateral to the tympanic membrane (ear drum). It consists of an auricle (pinna) and the external auditory canal.

The auricle is an oblong, flat fold of skin, irregularly shell shaped, molded by its contained elastic cartilage into various ridges and sulci, giving it a characteristic appearance. The auricle differs in its contour in various individuals, but both ears are usually symmetrical. Here is found the largest piece of elastic cartilage in the body.

The covering skin and underlying perichondrium of the auricle are thin and closely adherent to each other. The subcutaneous tissue is very scanty. In surface inflammatory processes, such as erysipelas, swellings of the pinna may become painful due to tenseness of the parts and consequent pressure on sensory nerve endings.

The landmarks of the auricle are the helix, antihelix, concha, tragus, antitragus, lobule, incisura, intertragica, auricular fossa and cavity of the concha leading to the opening or meatus of the external auditory canal. The cartilage of the external canal in front and below, forms an incomplete tube, open above and anteriorly, where it is completed by a tough fibrous tissue membrane extending between the tragus and the commencement of the helix. The helix is a circular folded outer edge of the pinna; the antihelix is the smaller ridge just opposite it. The tragus is the small tongue-like projection anterior to the meatus. The lobule is composed of adipose and connective tissue.

In the early history of man the external ear was a useful appendage to catch sound waves and functioned to "perk up" one's ears for sounds far distant. Cupping one's hand behind the ear is still practised in an effort to increase the reception of sound. However, the loss of the external ear does not reduce auditory acuity; the auricle is more of an adornment without an important function.

Vessels and Nerves

The sensory nerves of the auricle are branches of the great auricular and lesser occipital nerves from the cervical plexus and the auriculo-temporal branch of the mandibular division of the trigeminal nerve. The posteromedial portion of the external auditory canal is innervated by the auricular branch of the vagus nerve (Arnold's nerve). These nerve fibers have their cell bodies in the jugular ganglion. The vestigial auricular muscles are supplied by the temporal and posterial auricular branches of the facial nerve.

Owing to its meager blood supply, the cartilage is very prone to infection following trauma. When loss of cartilage takes place, deformity results.

Lymphatics

The abundant lymphatic plexus in the auricle, external, auditory canal and outer surface of the tympanic membrane empties into the anterior, posterior and inferior auricular lymph nodes. These nodes in turn drain into the upper deep jugular nodes.

Swelling of the retroauricular group of nodes may be confused with mastoiditis; a preauricular enlargement may be mistaken for parotitis, and an infraauricular swelling may be similar to the Bezold type of mastoiditis (sinking abscess). Parasitic and other infections of the scalp may cause enlargement of these nodes.

The External Auditory Canal

The external auditory canal (meatus acusticus externus) consists of membranocartilagenous and bony parts. It is about 1¼ inches (25 to 35 mm.) in length. The outer orifice is eliptical in shape with its greatest diameter directed from above downward. The cartilagenous portion forms about one third of the entire length of the canal, its direction being upward and backward. In the cartilage of the lower anterior wall are several transverse fissures filled by connective tissues, called the incisurae Santorini. These allow for flexibility of the canal. At birth the floor of the cartilagenous canal is close to the roof, but the bony framework develops so rapidly that at the age of two it presents a relatively wide lumen.

The *fissures* are of special interest. Infections of the external canal may extend through these incusurae and descend into the neck below, in front or behind the pinna. Infections can involve the parotid gland which is directly related to the external canal.

The bony canal fuses laterally with the membraneous portion, the latter making up one-third of the entire length of the external canal. The direction of the bony canal is downward and forward, an angle being thus formed at the junction of this with the cartilagenous portion.

How to Examine

This explains the inability to see the tympanic membrane by looking directly through the meatus. To accomplish such an examination, therefore, the auricle must be drawn up and back. In very small children, in addition to drawing the auricle upward, the tragus must be drawn forward with the finger.

The posterior wall is of varying thickness and lies in direct relation to the mastoid cells. In its inferior part it is in close proximity to the facial canal, through which passes the nerve to the muscles of facial expression.

The posterior wall of the bony canal represents the anterior wall of the mastoid process and is therefore of clinical interest, because infectious process of the middle ear in children and occasionally in adults break through the tympanomastoid suture and produce subperiostal abscesses. (The mastoid process does not develop until the sixth month and is not fully developed until the end of the fourth year of life.) The suture is one of the natural dehiscences of the mastoid process constituting a path of least resistance to infection.

The anterior wall is the thinnest, sometimes being as thin as paper. Occasionally, the antero-inferior bony wall is completely ossified (foramen of Huschke).

(Continued on Page 6)

This feature of AUDECIBEL is designed to keep you informed on current significant developments in the hearing aid industry and on significant happenings to individuals. Address contributions to *The Editor,* Suite 1209, 6 North Michigan Avenue, Chicago 2, Illinois.

Newsletter

The British Hearing Aid Industry may attempt to set up its own society of hearing aid audiologists, as a result of correspondence with and a recent visit to this Society's offices in Chicago by Gordon Dent, managing director of Ardente, Ltd., hearing aid manufacturers in London. Mr. Dent attended the New York meeting and was so impressed with the scope and vitality of the Society's program, particularly that phase of it concerned with ethical standards and certification of qualified hearing aid audiologists, that he made application for certification and stated that, in his opinion, such a program would furnish a vital and improved service to the hearing aid business as it exists today in England.

New Telex Lightweight Audiometer Well Received, says Bruce E. Holmstrom, advertising director of Telex, Inc., St. Paul-Minneapolis. Holmstrom says the portable Telex Audiometer just recently made available to hearing aid audiologists, measures hearing loss up to 90 decibels in five db stages by use of an air conduction receiver and pure tones, has a frequency range of 125 to 8,000 cycles, adjustable in seven octave steps. The compact new unit is about the size of a small radio and weighs only 11 pounds, 10 ounces.

A Hearing Aid User is not an interruption of your work—he is the purpose of it.

The Annual Meeting of AMA's Advisory Committee with Hearing Aid Manufacturers' Representatives brought some vital items under discussion. Dr. Richard Silverman, Director, Central Institute for the Deaf, St. Louis, discussed minimum requirements for programs offering guidance in selection of hearing aids. William S. Peters and F. M. Dukat of Raytheon presented up-to-the-minute data on the status of the transistor in relation to hearing aids. Sam Lybarger, vp of Radioear Corp., brought up for discussion standard American methods for the measurement of hearing aid characteristics. Howard Carter, AMA, Director of Biophysical Investigation, led the discussion concerning the use of master rather than individual hearing aids at Hearing Aid Centers. Grover C. Coil participated in the discussions as the representative of the Society of Hearing Aid Audiologists, reporting on the progress of the Society during its first year. Copies of the proceedings have not been made available at this time.

Radio Receptor Co. Uses Metal Jacket to Protect Transistors in hearing aids. Ludwig Arnson, president of the company, explains: "Radio Receptor's PNP Junction Transistors are being cased in corrosion-resistant metal rendering them impervious to humidity and able to withstand indefinitely high temperatures generated by the body." The new transistor case is an adaptation of one developed for military use in apparatus produced by the company.

Reverse Selling: Always argue and match wits with your customer.

American Hearing Society Selects Midwest Site of future home. Plans to move national headquarters of the American Hearing Society from the nation's capital to Columbus, Ohio, have been announced by Thomas L. Tolan, M.D., Milwaukee otologist, president of the agency. Members of the society's board of directors in session recently voted that the move from Washington to the Midwestern city should take place "as soon as possible." No date has been set for the change. The Society's head offices have been located in Washington since 1922.

American Hearing Aid Association names Leonard Davis, former newspaperman and public relations director for Vick Chemical Company, as Executive Secretary and Director of Public Relations, it has been announced by L. A. Watson, president. The AHAA is made up of leading manufacturers and suppliers in the hearing aid field, many of whom have long felt the need for better public understanding of the problem of deafness, the achievements of the hearing aid industry and the vast advances made in the last 10 years in professional fitting and servicing of the precision instruments.

Texarkana Doctor Wants to Meet SHAA Members. Dr. M. L. Williams, an otologist located at 619 Main St., Texarkana, Texas, requests that members of SHAA who are fitting and servicing hearing aids in that trading area call his office for an interview so that he may be informed as to their respective services.

Reverse Selling: Ignore your customer while you chat away about personal things on the telephone.

Audecibel Circulation Nears 12,000 Mark. Without any attempt to force growth of AUDECIBEL, the journal of the Society of Hearing Aid Audiologists, circulation has climbed steadily since its introduction a year ago, and plans are now under serious consideration to jump its schedule to bi-monthly publication starting in January 1954. A circulation statement compiled since the last issue shows the following circulation breakdown:

6990 copies to registered (AMA) Eye, Ear, Nose and Throat Physicians.
552 copies to members of the Society of Hearing Aid Audiologists.
463 copies to Hearing Clinics, veteran facilities, schools, colleges, technical libraries, etc.
3627 copies to hearing aid retailers throughout the world.

Any Hearing Aid Factory Engineer or Sales Manager can verify the fact that hearing aid dealers automatically become inventive amateurs immediately following their appointments. Perhaps one of them can turn the following tip into practical application, and find himself being hailed as the "Genius of Hearing Aid Audiology." It seems that Bell System researchers have determined that a flea jumping once a minute could supply all the energy needed to run the Bell System's transistor, designed to replace vacuum tubes and amplify sound. Now if you can just figure out a way to make the insect jump on schedule, and to harness his energy, you're in the genius business with a 1-flea power hearing aid.

The Hearing Aid User is the life blood of our business.

Sudden Death of Hal Oliver, Beltone, Shocks Industry. News of the sudden death of Hal Oliver from coronary occlusion on September 11, 1953, in Chicago, has shocked his former associates and many friends at Beltone, Aurex and Sonotone, and throughout the hearing aid industry. Only recently appointed by the Beltone Hearing Aid Company as manager of their Chicago retail office, Mr. Oliver was formerly Regional Sales Director for the Central Division of Beltone. During World War II he served as Lieutenant Commander with the United States Navy.

Volta Pays Unusual Tribute to two outstanding women executives. In a handsomely printed four-page brochure, the Board of Directors of the Volta Speech Association for the Deaf has announced the retirement of Miss Josephine Baxter Timberlake, since 1919 the honored executive secretary of the Volta Association; and simultaneously introduces and announces the appointment of Miss Alice Dunlap as her successor. Miss Timberlake's contributions in the interest of the deaf and hard of hearing have been many and varied. On her retirement, she was presented with a commemorative scroll, and will continue to serve the Association as a member of the Auxiliary Board of Directors.

A Hearing Aid User is part of your business —not an outsider.

Carl A. Odening of National Carbon is awarded Sloan Fellowship. Mr. Odening, superintendent of the Columbia, Tenn., plant of National Carbon Company, has been awarded an Alfred P. Sloan Fellowship under the Executive Development Program at Massachusetts Institute of Technology. Sloan Fellowships are awarded on the basis of national competition among young executives and provide an intensive year's training in industrial management.

Diseases of the Ear

by Alfred Lewy, M.D.

Fellow, American College of Surgeons
Senior Attending Otolaryngologist,
Mt. Sinai Hospital, Chicago, Illinois

Pathology in the external canal of the ear is of great interest to the audiologist. The commonest ailment encountered will be a small boil in the canal, an exceedingly painful situation for the patient. It is usually shown by pain on pressure outside the ear, on the tragus, or the movement of the auricle itself. By looking into the canal, at least as far as the drum membrane, it is possible to see the condition of the canal. Almost any of the skin diseases can attack the skin in the canal or behind the auricle. All of these will interfere with fitting of the ear mold.

The hearing aid audiologist will of course check for the presence or absence of foreign bodies, and for injuries. Many ear canals show some degree of deformity that may be congenital; external deformity of the ear is also commonly seen in prizefighters and wrestlers, and people who have had the ear damaged in various ways.

It should be determined whether or not there is a perforation in the drum membrane and whether or not there is a discharge present, an indication of any disease, whether acute or chronic. Most of the ears that have discharge are troubled with a conduction deafness and have an increased bone conduction; they can be fitted with a bone-conduction apparatus instead of the ear mold.

Painful ears may be encountered and yet there is nothing to see. Pain in or around the ear, without external evidence of disease or injury, may be a pure neuralgia.

Neoplasm or any evidence of growths around the ear should be diagnosed only by specialists.

Herpes and Deafness

Herpes is another condition frequently associated with deafness. Its symptoms are blister on the ear, and in the canal, usually preceded by pain, sometimes with a facial paralysis, sometimes also with dizziness. If there are any skin lesions around the ear, it is best to have them seen by a skin specialist or an otologist.

Diseases of the skin caused by mycotic infections may cause a discharge in the ear. They are difficult to handle, as is the ordinary eczema infection of the ear. Or the ear may be blocked by a cholesteatoma, the name given to an accumulation of skin that is usually the result of chronic suppurations, although it may occur without that.*

After careful examination of the external part of the ear canal, the next step is to check the tympanic membrane for inflammation or perforation. A dull colored membrane that is retracted may indicate a type of deafness called chronic adhesive process, which frequently follows tubal inflammation.

Another form of deafness, usually associated with a feeling of stuffiness in the ear and more or less discomfort, is the dental malocclusion syndrome. This is caused by an over-bite due to missing teeth, or malocclusion, which dislodges the head of the mandible. It may be corrected by the dentist.

A careful check should be made against the possibility of serous otitis, in which there is an accumulation of fluid in the tympanic cavity. Because of the closure of the Eustachian tube, the fluid is not being absorbed. This type of deafness can sometimes be relieved only temporarily by treatment. The deafness returns and the original treatment has to be repeated. The cause must be determined and removed if possible.

Any acute inflammation may extend to the mastoid and to the intra-cranial content. There is also such a thing as tuberculosis affecting the inner canal or middle ear.

Types of Deafness

The types of deafness most suitable for hearing aids are the chronic adhesive process and otosclerosis, if nerve degeneration is not too great, and some cases of inner-ear deafness. Most cases of originally conductive deafness eventually result in some degeneration of the nerve.

Nerve deafness is characterized by loss of high tones, and also by shortened bone-conduction. Such deafness can be characterized by great loss at about 4096 cycles, c-5, and may be caused by trauma.

When there is loss of high tones and shortened bone conduction, there should always be considered the possibility of tumors affecting the eighth nerve, or lying in the cerelullar-pontile angle. Such tumors, by pressing on the eighth nerve, can cause nerve deafness, also vertigo, and eventually other symptoms will be displayed leading to examination by a brain surgeon.

Deafness attended by dizziness is often caused by Meniere's disease. Deafness of this type usually fluctuates; in the intervals between attacks, you may be able to give the patient a good fitting. However with another attack, the whole hearing picture changes and the hearing aid will no longer be adequate. Under any circumstances, a permanent selection is difficult because many cases of deafness are progressive and the hearing aid will be adequate for a certain length of time only.

The only pathology typical of Meniere's syndrome is an excess amount of fluid in the internal ear, causing "internal ear deafness." Nerve deafness is also called "inner ear deafness." Many conditions of vertigo may be incorrectly diagnosed as Meniere's syndrome. In Meniere's disease vertigo sometimes comes on with severe vomiting, and there may be repeated attacks.

Increase of Wax

It is probably true that the use of a hearing aid stimulates the serum glands and increases the secretion of wax, as does the presence of any foreign body in the ears. Such wax may interfere with the operation of a hearing aid, and the individual should be referred to an otologist for the removal of the wax.

There is need for clarification in the matter of presence of wax in connection with the fitting of a hearing aid. After removal, the otologist may differ with the hearing aid audiologist, resulting in inconvenience for the patient and mutual embarassment. SHAA has established a board to consider educational projects of this specific kind.

Dr. Skolnik

(Continued from Page 4)

When fracture of this wall occurs, the prognosis is very bad because of ankylosis of the joint. The proximity of the temporomandibular joint to the external ear must be taken into consideration, especially if an ear mold is to be worn. Movements of the surrounding structures of the temporomandibular joint especially in pathological states such as malocclusion, may result in severe discomfort relative to the external canal.

Dr. Skolnik's basic and relatively complete article will be published in several sections. Watch for them in future issues of Audecibel. We suggest that you retain all your copies of this journal for future reference to the various and related technical articles appearing herein.

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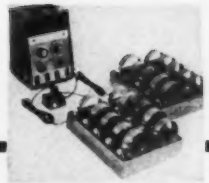

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. . . to the speakers, each and every one, who cooperated so fully during our New York Meeting in presenting the fruits of their varied skills, knowledge and experiences for the benefit of everyone interested in or concerned with the problems of the hard of hearing. It was an outstanding program, and most unusual in that it combined, for the first time, physicians and educators, clinicians and social service workers, researchers and technicians.

Starting with Dr. Anson's paper on page 9 of this issue, AUDECIBEL will continue to publish, in as complete form as possible, the material that was presented, so that it may be available in convenient form to all those who seek to progress intelligently in this challenging and dynamically developing field.

Herewith a list of speakers and subject matter:

Scientific Papers

"Development of Ear and Temporal Bone" **(See Page 9.)**

Barry J. Anson, Ph.D., Professor of Anatomy, Northwestern University Medical School

"Medical and Surgical Management of Deafness"—Graydon G. Boyd, M.D.

"The Psychological Aspects of Deafness"

Lester L. Coleman, M.D., Associate Surgeon, Manhattan Eye and Ear Hospital

"The Middle Ear"

Paul Lindenberg, M.D., Instructor, College of Physicians and Surgeons, Otologist at Columbia Presbyterian Medical Center, Medical Supervisor of Speech and Hearing Clinic, Vanderbilt Clinic, New York

"Improvement of Low-Tone Deafness and Tinnitus by Mandibular Repositioning"

S. H. Ronkin, D.D.S., Asst. Professor, Human Anatomy, Temple University School of Dentistry, Chief of Staff, Mt. Sinai Hospital, Philadelphia

"Minor Surgery for Otosclerosis and Ménière's Disease"

Samuel Rosen, M.D., Associate Otologist, Mt. Sinai Hospital, New York

Educational

"Hearing Conservation in Children"

Richard Bellucci, M.D., Surgeon in Charge, Hearing and Speech Clinic, Manhattan Eye and Ear Hospital, New York

"Rehabilitation for Deafness"

Dr. Moe Bergman, Ed.D., Chief Audiologist, N.Y. Regional Office, Veterans Administration, lecturer in Otolaryngology College of Physicians and Surgeons, lecturer in Special Education, Teachers College, Columbia University

"Teachers College Program for Teachers of the Acoustically Handicapped"

Maurice Fouracre, Ph.D., Head of Dept., Special Education, Teachers College, Columbia University

"Why Wear a Hearing Aid?"

Aram Glorig, M.D., Director of Audiology and Speech Clinic, Walter Reed Army Hospital, Washington

"Never Underestimate the Power of an Idea"

Beatrice Jacoby, Ph.D., Assistant Professor, Speech and Hearing Clinic, Queens College

"The Use of Hearing Aids with Deaf Children"

Dr. Clarence O'Connor, Supt. Lexington School for the Deaf, lecturer, Teachers College, Columbia University, Dept. of Special Education

Technical Research and Developments

"The Discovery and Evolution of the Transistor"

R. L. Wallace, Bell Telephone Laboratories

Mr. Wallace's address was followed by a series of speeches discussing the development and application of transistors in the hearing aid field, presented by the following:

David Barnow, Beltone
S. F. Lybarger, Radioear
William S. Peters and F. M. Dukat, Raytheon
Andrew Proper, Audivox
Leland Watson, Maico

General

"The Need for New and Better Informed Manpower and Creative Selling"

David Barnow, American Hearing Aid Manufacturers Assn.

COOPERATING EXHIBITORS

At the recent National Hearing Aid Show in New York, 28 firms and organizations using 41 booths presented educational and technical exhibits, thereby contributing greatly to the success of that event. Their participation also gave evidence of their deep cooperative interest in the work of the Society of Hearing Aid Audiologists. We list their names herewith for your information. On request, we will be glad to furnish you with full addresses.

Acousticon Co., Div. Dictagraph, Inc.
American Hearing Society
Audivox
Beltone Hearing Aid Company
CBS-Hytron Radio & Electronics Corp.
Dahlberg Company
Dyna-Labs
General Dry Batteries, Inc.
Hal-Hen Company
Hunter College
International Hearing Aid Assn.
R. R. Mallory & Co., Inc.
J. J. Manning, Ear Pieces
Manhattan Eye & Ear Hospital
Microtone Company
National Carbon Company
National Hearing Aid Laboratories
New York Eye and Ear Infirmary
New York League for Hard of Hearing
Nichols & Clark
Philco Company
Pittsburgh Eye & Ear Hospital
Qualitone Hearing Aid Company
Raytheon Mfg. Company
Radioear Corporation
Sonotone Company
Scientific Plastics, Inc.
Volta Bureau

"Trade Practice Rules for the Hearing Aid Industry"

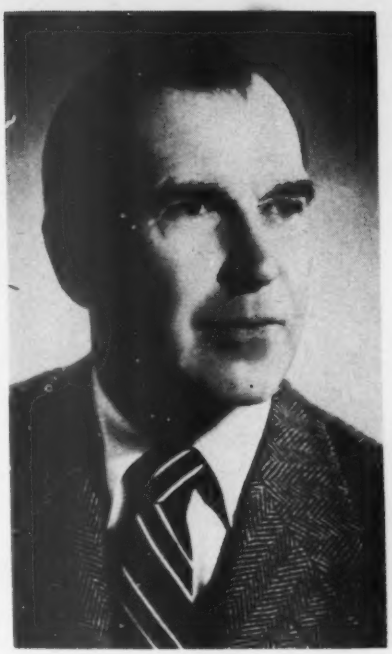
This is the title of an important booklet now available, without charge, from SHAA. It lists, in some detail, the trade practice rules for the hearing aid industry as promulgated by the Federal Trade Commission, Washington, as of August, 1953, and contains vital and valuable information for all hearing aid audiologists. Write us for your copy, today. Enclose 10c postage, please.

Don't Resign From Your Trade Association

There is nothing more dangerously extravagant. It is a wasteful squandering of the invaluable asset of good teamwork at a time when collaboration is absolutely vital. When you are out in mid-ocean in a storm, do you see anybody shoving off from the big liner in a rowboat, to save passage money? Think it over!

Development of the Ear and the Temporal Bone

by Harry J. Anson, Ph. D. (Med. Sc.)
Professor of Anatomy, Northwestern University Medical School
Chicago, Illinois



Dr. Harry J. Anson is recognized as one of the world's foremost anatomists. The following abstract has been prepared by Dr. Anson from material presented by him in a lecture illustrated by slides, and is based upon collaborative studies conducted under the auspices of the American Otological Society by Dr. Theodore H. Bast of the University of Wisconsin with Dr. Anson.

Many elements of the auditory apparatus are derived from the branchial apparatus, which, in aquatic and amphibious creatures, serves a respiratory function. In the process of conversion, the three germ layers contribute to the formation of the ear.

Protuberant branchial arches situated externally on the embryonic head, bound a branchial groove which presses toward a corresponding outpocketing, or pouch, of the pharynx. The groove, lined by ectoderm, is separated from the entoderm of the primitive gut-tract by mesodermal tissue. Together these three layers of the primordial closing plate later form the tympanic membrane which separates the external from the middle ear. Outside, branchial arches (mandibular and hypoid) give rise to the auricle; the grooved depression between them is the source of the external acoustic meatus.

Inside Succession

Inside, through subsequent expansion, the branchial pouch becomes, in succession, the auditory (Eustachian) tube, the tympanic cavity and the latter's extensions, namely, the epitympanic recess, the antrum and the air cells. This entodermal layer, which is the mucous membrane of the developing middle ear, drapes itself over the auditory ossicles.

The auditory ossicles, which likewise are constituents of the middle ear, are derived from the branchial skeleton, specifically, from the cartilaginous supports of the branchial arches. The small muscles and ligaments which are associated with the ossicles arise from the mesoderm in which these cartilages are imbedded.

In addition to contributing the cutaneous portion of the auricle, the lining of the external acoustic meatus and the cuticular layer of the tympanic membrane, the ectoderm is the source of the otocyst, from which is derived the system of continuous epithelium-lined channels of the membranous (endolymphatic or otic) labyrinth of the internal ear. This series of epithelial tubes and chambers includes the ducts of the cochlear and canalicular divisions of the internal ear, the utricular and saccular enlargements of intermediate, or vestibular, position, and the lesser ducts which bring these elements and the endolymphatic sac into communication. At the outset, the forerunner of the otocyst is a placodal thickening on the lateral aspect of the embryonic head, situated opposite the hindbrain and above the groove between the first (mandibular) and second (hyoid) branchial arches; becoming depressed below the surface, the placode assumes the form of a pit whose attachment to the parental ectoderm is soon reduced to a stalk. When the stalk-like connection is lost, the former pit becomes an independent vesicle lodged with mesenchymal tissue derived from the mesoderm.

Through elongation of the vesicle in dorsoventral direction, and as a result of concurrent appearance of infoldings in its epithelial wall, the primordia of the future labyrinth become identifiable. An upward-directed prolongation, along the hindbrain, will become endolymphatic (otic) duct and sac; a downward-directed portion is the primordium of the cochlear duct; a bay-like outpocketing on the lateral aspect of the vesicle is the forerunner of the three semicircular ducts; the intermediate part of the vesicle will become the utricle and the saccule.

Osseus Labyrinth

The precartilaginous otic capsule develops around the differentiating otocyst. Before the cartilage is converted into bone, reversal in development of the precartilage results in the production of a succession of channels between the epithelial duct-system and the capsule. Generally matching the more capacious, these spaces constitute parts of the so-called osseous (perilymphatic or periotic) labyrinth which contain the perilymphatic fluid of the adult ear. These spaces are the tympanic and vestibular scalae, the semicircular canals, the vestibule and such lesser offsets as the cochlear canaliculus, the proximal segments of the vestibular aqueduct (which transmits the endolymphatic duct and sac) and certain fissular channels near the vestibular (oval) window of the capsule.

The cartilage which encapsulates the periotic labyrinth undergoes rapid ossification, to attain adult dimensions when the fetus has just reached the middle of intrauterine life. Thereupon is initiated the process of periosteal bone increment, through the operation of which the otic capsule, while retaining fetal dimensions, becomes imbedded in the *pars petrosa* of the temporal bone.

Common Diseases of the Hearing Apparatus and How They Affect Hearing Function

by Dr. Heinrich G. Kobrak
Associate Professor of Otolaryngology
University of Chicago

Dr. Kobrak has been associated with the University of Chicago since 1946. He is a graduate of the University of Munich, receiving his M.D. degree in 1928, with post graduate work in Basle, Switzerland and Heidelberg, Germany. In 1934, Dr. Kobrak was certified as an Ear, Nose and Throat Specialist by the American Board of Otolaryngology, and in 1937 he received his Ph.D. from the University of Chicago. In 1936, Dr. Kobrak established private practice in Otolaryngology in Gary, Indiana, which he left to serve with the Army of the United States from 1942 to 1946.

The ear is divided into three parts: the outer, the middle, and the inner ear. The outer ear consists of a funnel (auricle) and a canal. Dividing the outer ear from the middle ear is the eardrum. The middle ear is a cavity containing the three small ossicles, the hammer, the incus, and the stapes. Behind the middle ear is the inner ear, in which are located the nerves that carry sound messages to the brain. The Eustachian tube is the open canal between the middle ear and the nasal pharynx.

Distinguishing Tests

Sound waves travel through the outer ear canal, set up vibrations of the middle ear structures and are concluded in the nerve endings of the inner ear. In a case of diminished hearing the otologist must determine where the disease is located, the nature of the disease, and, of course, how it can be treated. Practically from the beginning of otology certain tests have made it possible to distinguish between lesions located in the middle ear, where sound is conducted by the ossicles, and lesions located in the inner ear. When conduction over the ossicular chain is interrupted, making it impossible for the middle ear to function, it is still possible for sound to reach the brain by a different path. Sound may go around the middle ear by way of the surrounding bone, that is, by bone conduction.

One of the most important methods used in locating a lesion is the bone-conduction test, which is a comparison between hearing by conduction and by bone conduction. The test is made very easily and rapidly with tuning forks. Named the Rinne test, after the man who first described it, this old-fashioned but still valuable tuning-fork test should not be omitted, even though bone-conduction receivers for use with audiometers are now available. You strike a tuning fork and set its stem against the forehead or the teeth of the patient. In a case of middle-ear lesion you find that the patient's hearing of the fork by bone conduction is diminished by the middle ear lesion. Under normal conditions, air conduction is better than bone conduction, but with middle ear lesions bone conduction is better than air conduction. The bone-conduction hearing aid is, of course, based on the possibility of conducting sound into the inner ear when middle ear conduction is destroyed. In a case of inner ear lesion, air conduction and bone conduction are equally diminished.

The statement that the Rinne is positive means that a tuning fork can still be heard by air conduction when it is held in front of the ear canal after it can no longer be heard by bone conduction. The Rinne is positive under normal conditions and also in inner ear lesions. In middle ear lesions the Rinne is negative, that is, the hearing by bone conduction persists longer than that by air conduction.

Air in Middle Ear

Under normal conditions, the act of swallowing opens the Eustachian tube for a short time and permits air to refill the middle ear cavity. But air is not replaced if the tube is blocked by a disease process. Most blockage takes place at the orifice, and is often due to adenoids. If the tube is blocked, air in the middle ear is partly absorbed. (Air enclosed in the human body is absorbed by blood in the blood vessels in the mucous membranes. This absorption of air is a normal function of blood vessels; it goes on all the time in the lungs.)

When air pressure is lowered in the middle ear back of the drum, the drum is pushed inward, or retracted, by the normal outside pressure. Various injurious sequelae may result when this occurs. Since the membrane is very thin it may be stretched to the breaking point. If the underpressure lasts for any length of time, the stretched portion breaks. If the eardrum is ruptured, a disease may develop which no penicillin nor sulfa is able to stop. This is a growth of tumorlike tissue, called a cholesteatoma. It is not a real tumor but consists only of skin growing into the middle ear, gradually filling the space and pressing on the bone. Unless this tubal disfunction is recognized and treated in the early stages, it may require mastoid surgery later. Continued growth of an unrecognized cholesteatoma may lead to very serious complications. (Brain abscess, meningitis, a thrombosis of the sinus, or deafness by destruction of the inner ear.)

Disease of Inner Ear

A disease that has found much attention, but of which little is known, is one that strikes suddenly and with hardly any warning. A patient suddenly suffers hearing impairment, gets dizzy, and hears many noises. These three symptoms were first recognized as a disease of the inner ear about 90 years ago by Professor Meniere, a French teacher of the deaf. He pointed out, correctly, that this is a disease of the inner ear ten years before physiologists showed that the inner ear is the seat of equilibrium. Meniere's disease is of unknown origin. There are many theories but none has really fully explained the cause and nature of the disease.

Adenoids in children may cause an obstruction of the Eustachian tube or diminished hearing for years without anybody knowing it. Loss of the first 20 or 30 decibels may go entirely unnoticed. An obstruction of the tube on one side may result in an advanced deafness with a loss greater than 30 or 40 decibels going unnoticed because the child can hear with the other ear. For this reason the importance of hearing tests in schools can't be overstressed. If early symptoms of obstruction are not discovered and treated in time, ***they will cause permanent deafness later on.*** The answer to the obstruction of the Eustachian tube in children is the removal of adenoids.

(The balance of Dr. Kobrak's paper will appear in the next issue of Audecibel.)

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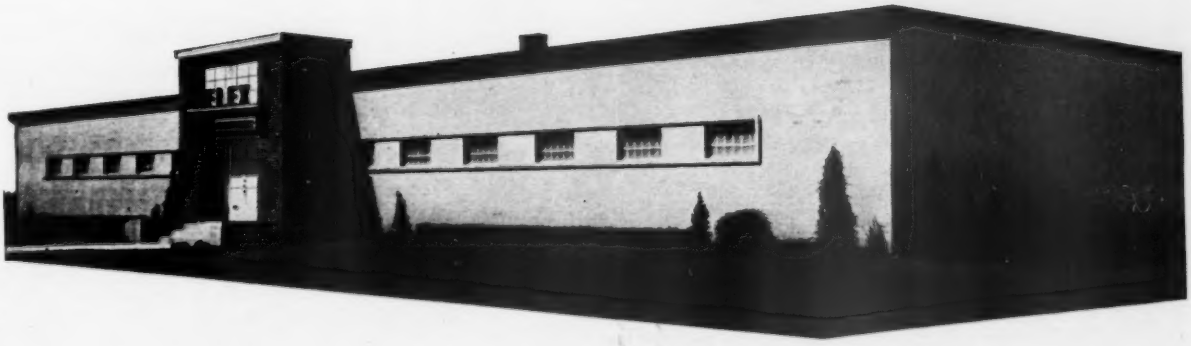

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Almost daily, the Society receives letters asking for ". . . a list of individuals and firms in this locality certified to service, fit and sell hearing aids . . .", to use an exact quote from a recent inquiry. These requests come from all over the country, from such persons as physicians and bank presidents as well as housewives and businessmen, and people in every walk of life.

In addition, in recent weeks the official list of SHAA members has been furnished, on request, to the following major reference sources:

Board of Education, Webster Grove, Mo.
Bureau of Public Health Nursing, Charleston, W. Va.
Family Service Agency, Stockton, Calif.
Marriage Council, Philadelphia, Pa.
Minneapolis Public Library, Social Service Branch
United States Department of Agriculture
Visiting Nurse Association, Milwaukee, Wisc.

This is but one of the reasons why it is important to you to complete without further delay your Certification Quiz. During the recent New York meeting, fourteen persons applied to the examining board for admittance into the Society; 10 were recommended to the Certification Board and 4 were deferred for further study and re-examination.

The 1954 Roster of Certified H.A.A.s will be published with the January/February issue of AUDECIBEL.

ONLY members of S.H.A.A. are qualified to be listed in the classified Telephone Directory in your town under the trade mark heading: "Certified Hearing Aid Audiologists." Are You So Listed? Ask for Details!

The Society's 1953 award for Engineering Achievement is here being presented to Raytheon Manufacturing Company's W. S. Peters, left, manager of Raytheon hearing aid tube and transistor sales, by Mr. Thornton Zanolli, president, Society of Hearing Aid Audiologists. The award was given in recognition of Raytheon's outstanding achievement in transistor design and production with specific reference to Raytheon's revolutionary junction-type transistor.

Grover C. Coil, right, executive director of the Society of Hearing Aid Audiologists, here presents the Society's 1953 Advertising Award to Mr. Ager Johnson, president, National Carbon Company, for that company's continuing and outstanding national advertising program which is devoted to the public acceptance of hearing aids and of those who service, fit and sell hearing aids.

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. . . a Message from *Grover C. Coil*

Research—Good & Bad!

(Continued from Page 2)

per person; 86% of the public clinics offered hearing aid evaluation.

Whatever activities these borderline clinics are engaging in under the guise of research certainly would come under the heading of bad research as far as the hearing aid distributor is concerned, because they are educating the public not to seek the advice and counsel of the hearing aid retailer but to go directly to the clinic and to be there advised regarding his hearing aid needs.

There are certain things that constitute minimum standards for hearing aid evaluation and fitting. If you and your office are not prepared to provide these minimum standards, it is only a question of time until you will find that your prospective purchasers who have been educated by the otologist and the clinic will forsake you and go to the place where at least these minimum standards are advertised and available.

Every hearing aid audiologist should be able to provide in his own establishment the necessary analysis and fitting procedure to eliminate the necessity for any, other than medical and problem cases, being referred by anyone to a clinic.

In our opinion only two kinds of hearing aid retailers will survive—over-the-counter sales and those providing a professional fitting service. The in-between hand-waver and fast talker will fast disappear from the sales picture. The racket will be taken out of the hearing aid business as it was out of the eyeglass business by the education of the buying public to evaluate properly the different selling methods employed at the retail level.

Those distributors wise enough to see and prepare for these changes will have a more stable and more permanently profitable business than they ever had in the past.

There is yet time to decide between education or eradication. Join the Society of Hearing Aid Audiologists. Learn more and earn more in '54!

MANUFACTURERS ASSN. MEETS IN NEW YORK

During the New York meeting of the American Hearing Aid Manufacturers Association at the Hotel Commodore, held in conjunction with the New York SHAA meeting, a wide list of subjects were discussed, some at length, some briefly to be followed by committee action. Of particular interest to those present seemed to be the following items:

- Patent and licensing situation relating to transistors.
- Generalized master hearing aid units which might be supplied to public aid clinics.
- F.T.C. Trade Practice Rules as promulgated for the Hearing Aid Industry.
- A possible yearly technical section at which engineering executives of member firms might exchange information, discuss standards, etc.
- The future role of the manufacturers' Association in education, certification and recognition.
- Possible clearing house set-up to collate sales data within the industry.
- Consideration of candidates for the position of Executive Secretary of the Association and Public Relations representative for the industry.

Some of those in attendance state that, in their opinion, this was the most productive meeting of this group that they had attended.

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The Audiolo— Gist of Things

Finger Manipulation Technique

Q. Is it true that very severe hearing losses can be restored through so-called finger manipulation at the orifice of the Eustachian tube, as has been claimed occasionally?

Dr. Kobrak: It has been stressed that the orifice of the Eustachian tube should be cleaned out to permit air to reenter the middle ear cavity under certain conditions of hearing loss. The finger is too big for removal of fine particles. The finger might be enough to touch and to feel things in the nasal pharynx. We employ the finger for diagnosis but never for treatment or removal of lymphatic tissue. The instrument is cleaner and can remove finer particles.

Recovery After Tissue Removal

Q. What speed of recovery or improvement might be expected after the removal of adenoids or lymphatic tissue?

Dr. Kobrak: Improvement after removal of adenoidal tissue is a slow one because it takes time to have the air re-established and time to have the fluid absorbed. It may take two, three or even four weeks before we can hope to have a visible change. The maximum improvement will depend on the condition. If you just put fluid in the middle ear alone, you can expect a sustained hearing loss of 30 decibels, maybe 35. If that fluid is completely drained, reabsorbed, and normal middle ear conditions prevail, you can have a return to zero loss or absolute normal.

Immediate Return of Hearing

Q. I understand that when you inflate the tube the patient can immediately hear better. Is that true and if so, how much hearing can you expect?

Dr. Kobrak: Yes, it is true. The immediate result is that the retracted ear drum is restored to a normal position when air is shot from behind. When there is no fluid in the middle ear, you may have immediate restoration of hearing. The amount may, however, vary quite a lot. You might have a 30 db loss restored to normal. But if the tube is not treated at the same time, the loss of hearing will come back. The air has to be absorbed but if the air tube is not functioning normally, the air can be trapped again so the result will not be lasting.

Degree of Hearing Return

Q. If there are no adhesions, can you expect a fairly complete cure as a result of opening the Eustachian tube?

Dr. Kobrak: For the next day or two, yes.

Q. What if there has been a loss of 60 or 70 decibels?

Dr. Kobrak: A patient with 70 db loss may well have more than one pathology. Some part of the deafness may be due to tubular disfunction. If the patient gets from 60 or 70 to 30 after opening the tube, he has been done a great service, but such treatment alone could rarely restore normal hearing.

Water in the Ear

Q. Is it possible for swimmers to get water in the middle ear through the Eustachian tube?

Dr. Lewy: That frequently happens with swimmers. Incidentally, I have never seen a person who has been swimming and diving for years who did not have some ear trouble. When the water lodges in the external canal, it can be removed quite easily, but in many cases when it gets through the Eustachian tube it carries infection. That is one reason why it is exceedingly dangerous for a person to go in swimming when he has a cold.

Increase of Wax

Q. Does the use of a hearing aid, or an ear mold, stimulate the serum glands in any way? I have been told by people that they did not begin to have trouble with wax until after they started wearing a hearing aid.

Dr. Lewy: As a matter of theory, the presence of any foreign body in the ear could stimulate the secretion of wax.

With the gracious cooperation of our distinguished speakers at SHAA meetings, time is allowed for an open discussion period after their papers have been presented. Interesting and vital information is frequently brought out succinctly during these question-and-answer exchanges, and, in the future, we shall present as much of this material as possible.

In addition, if *you* have a question which you would like to have authoritatively answered by experts such as those who have participated in our meetings, send it in to us and we will arrange for a reply. We will also welcome your suggestions and comments concerning material appearing in AUDECIBEL. Send communications directly to The Gist of Things, Audecibel, 6 North Michigan Avenue, Chicago 2, Illinois. Names must accompany such communications, but will not be used in case of publication, if so requested.

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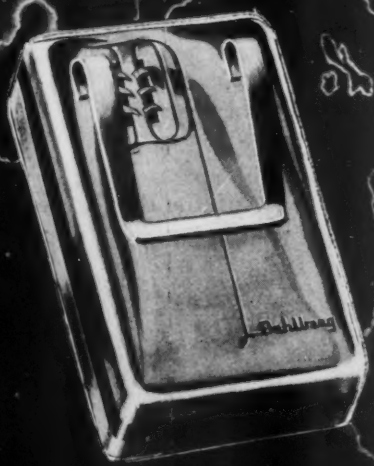

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